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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/677,797
Filing Date: October 02, 2003
Appellant(s): BALL ET AL.

James A. Blanchette
Reg. No. 51,477
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed February 24, 2009 appealing from the Office action mailed July 25, 2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

7054311	Norman et al.	5-2006
6999454	Crump	2-2006
2005/0041665	Weyman et al.	2-2005

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-9 and 11-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norman (7054311) in view of Crump (6999454).

Regarding claims 1, 11, and 20, Norman teaches a distributed software architecture system configured to implement a routing protocol in a router of a computer network, the system comprising:

a plurality of processors (Column 5, lines 23 – 27);

a switch fabric interconnecting the processors (Column 6, lines 19 – 26); and

a plurality of processes each running on a different one of the processors (Column 7, lines 19 – 41; Column 5, lines 23 – 27, where each router has multiple controller cards and those controller cards are the multiple processors running a process with performs the steps), the processes including two or more speakers and a protocol routing information base (RIB) that is used by each of the two or more speakers on the different ones of the processors (Column 9, lines 24 – 39; Col. 8, lines 37-55; where the RIB is stored in memory units 130x and 130y and Fig. 1B and 1C show that those memory units are centrally located), each speaker operate independently to (i) handle one or more connections to peer routers of the router (Col. 6, lines 64 – Col. 7, line 4), (ii) receive and store routes from those peer routers (Col. 6, lines 64 – Col. 7, line 4), and (iv) download all routes received from the peer routers (Column 8, lines 37 – 49, where the update information is sent to the controller card for further processing).

Norman does not explicitly indicate apply inbound policy to the routes received from the peer routers, filtering using the inbound policy, to the protocol RIB, the protocol RIB configured to perform a first stage of route selection to compute a set of best routes from among the routes downloaded from all of the speakers of the router.

Crump teaches a distributed router, including a switch fabric that shares RIB information with its neighbors (Column 5, lines 54 – 63; Column 3, lines 56 – 64) which includes

Filtering routes (Column 11, lines 5 – 9) and computing a set of best routes among the routes downloaded from the speakers of the router (Column 7, line 61 – Column 8, line 4; Column 9, lines 12 – 18; lines 29 – 35; lines 56 – 60).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Crump's teaching of computing the best routes for the routing table in Norman's system in order to improve router performance by quickly reducing the number of routes that need to be considered and re-communicated over the network to just the best and backup routers.

Regarding claim 18, Norman teaches an apparatus adapted to implement a Border Gateway Protocol (BGP) routing protocol in a router of a computer network (Column 6, lines 54 – 59) as a distributed software architecture system (Column 5, lines 23 – 27), the apparatus comprising:

A first processor of a plurality of interconnected processors to run a BGP speaker on (Column 9, lines 24 – 39), the BGP speaker including:

means for handling one or more connections to peers of the router (Col. 6, lines 64 – Col. 7, line 4),

means for receiving and storing routes from those peers (Col. 6, lines 64 – Col. 7, line 4), and

means for downloading all routes received from the peers (Column 8, lines 37 – 49, where the update information is sent to the controller card for further processing).

a second processor of the plurality of interconnect processors to run a RIB (Column 9, lines 24 – 39; Col. 8, lines 37-55; where the RIB is stored in memory units 130x and 130y and Fig. 1B and 1C show that those memory units are centrally located and are controlled by the control entity processor)

Norman does not explicitly indicate apply inbound policy to the routes received from the peer routers, filtering using the inbound policy, to the protocol RIB, the protocol RIB configured to perform a first stage of route selection to compute a set of best routes from among the routes downloaded from all of the speakers of the router.

Crump teaches a distributed router, including a switch fabric, that shares RIB information with its neighbors (Column 5, lines 54 – 63; Column 3, lines 56 – 64) which includes

Filtering routes (Column 11, lines 5 – 9) and computing a set of best routes among the routes downloaded from the speakers of the router (Column 7, line 61 – Column 8, line 4; Column 9, lines 12 – 18; lines 29 – 35; lines 56 – 60).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Crump's teaching of computing the best routes for the routing table in Norman's system in order to improve router performance by quickly reducing the number of routes that need to be considered and re-communicated over the network to just the best and backup routers.

Regarding claims 22 and 28, Norman teaches a method comprising;

running a first speaker on a first processor of a router, the first speaker (i) handle one or more connections to peer routers of the router (Col. 6, lines 64 – Col. 7, line 4), (ii) receive and store routes from those peer routers (Col. 6, lines 64 – Col. 7, line 4), and (iv) download all routes received from the peer routers (Column 8, lines 37 – 49, where the update information is sent to the controller card for further processing);

running a second speaker on a second different processor of the router, the second speaker running independently of the first speaker, the second speaker i) (i) handle one or more connections to peer routers of the router (Col. 6, lines 64 – Col. 7, line 4), (ii) receive and store routes from those peer routers (Col. 6, lines 64 – Col. 7, line 4), and (iv) download all routes received from the peer routers (Column 8, lines 37 – 49, where the update information is sent to the controller card for further processing);

running a protocol RIB on a third different processor of the router, the protocol RIB performing a first stage of route selection to compute a set of best routes from among the routes downloaded from speakers (Column 6, lines 42 - 48); and

presenting, by the first speaker, second speaker and protocol RIB, an appearance of a single routing protocol process to devices external from the router (Column 9, lines 46 – 65).

Norman does not explicitly indicate apply inbound policy to the routes received from the peer routers, filtering using the inbound policy, to the protocol RIB, the protocol RIB configured to perform a first stage of route selection to compute a set of best routes from among the routes downloaded from all of the speakers of the router.

Crump teaches a distributed router, including a switch fabric, that shares RIB information with its neighbors (Column 5, lines 54 – 63; Column 3, lines 56 – 64) which includes

Filtering routes (Column 11, lines 5 – 9) and computing a set of best routes among the routes downloaded from the speakers of the router (Column 7, line 61 – Column 8, line 4; Column 9, lines 12 – 18; lines 29 – 35; lines 56 – 60).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Crump's teaching of computing the best routes for the routing table in Norman's system in order to improve router performance by quickly reducing the number of routes that need to be considered and re-communicated over the network to just the best and backup routers.

Regarding claims 2, 12, 19, 21, and 24, Norman teaches the system of claims 1, 11, 18, 20, and 24.

Norman does not explicitly indicate a local RIB (loc-RIB) maintained by the protocol RIB and configured to store the set of best routes computed by the protocol RIB.

Crump teaches a local RIB (loc-RIB) maintained by the protocol RIB and configured to store the set of best routes computed by the protocol RIB (Column 7, line 61 – Column 8, line 4; Column 9, lines 12 – 18).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Crump's teaching of computing the best routes for the routing table in Norman's system in order to improve router performance by quickly reducing the number of routes that need to be considered and re-communicated over the network to just the best and backup routers.

Regarding claims 3, 13, and 25, Norman teaches the system of claims 2, 12, and 22.

Norman does not explicitly indicate wherein the processes further include a global RIB configured to maintain a routing table for the router.

Crump teaches a global RIB configured to maintain a routing table for the router (Column 9, lines 49 – 60; Column 9, line 64 – Column 10, line 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Crump's teaching of computing the best routes for the routing table in Norman's system in order to improve router performance by quickly reducing the number of routes that need to be considered and re-communicated over the network to just the best and backup routers.

Regarding claims 4, 15, and 26, Norman teaches the system of claims 3, 13, and 22.

Norman does not explicitly indicate wherein the protocol RIB is configured to download the set of best routes from the loc-RIB to the global RIB, the global RIB further configured to use the downloaded set of best routes from the loc-RIB, along with other sets of best routes downloaded from other routing protocols, to perform a second stage of route selection s that computes optimal routes for installation in the routing table.

Crump teaches the protocol RIB is configured to download the set of best routes from the loc-RIB to the global RIB, the global RIB further configured to use the downloaded set of best routes from the loc-RIB, along with other sets of best routes downloaded from other routing protocols, to perform a second stage of route selection s that computes optimal routes for installation in the routing table (Column 7, line 61 – Column 8, line 4; Column 9, lines 12 – 18; lines 29 – 35; lines 56 – 60, wherein Crump uses both the local routes and the remote routes to determine both the best routes and the non-best routes for each, creating the optimal routes by using the best routes found and advertising them).

Regarding claims 5, 16, 27, and 30, Norman teaches the system of claims 4, 15, 22, and 30 further comprising one or more line cards connected to the switch fabric, each line card configured to render forwarding decisions on packets received at the router (Column 5, line 57 – Column 6, line 4) using a forwarding information base (FIB) constructed from the optimal routes installed in the routing table (Column 6, lines 42 – 53; Column 7, lines 5 – 7).

Regarding claim 6, Norman teaches the system of claim 2 wherein the bRIB is further configured to upload the set of best routes to the speakers to allow the speakers to advertise the best routes to the peer routers (Column 7, lines 8 – 10; Column 6, lines 54 – 56).

Regarding claim 7, Norman teaches the system of claim 6 wherein each speaker is further configured to apply outbound policy to the best routes prior to advertising them to the peer routers (Column 7, lines 8 – 10; Column 9, lines 24 – 29).

Regarding claim 8, Norman teaches the system of claim 7 wherein each speaker is further configured to advertise the best routes using update messages (Column 13, lines 23 – 43).

Regarding claims 9 and 23, Norman teaches the system of claims 8 and 22 wherein the routing protocol is a Border Gateway Protocol (BGP) and wherein the protocol RIB is a BGP RIB (bRIB) (Column 6, lines 54 – 59).

Regarding claim 14, Norman teaches the method of claim 13 wherein the second and third processors are the same processor (Column 7, lines 19 – 30)

Regarding claim 17, Norman teaches the method of claim 12 further comprising the steps of: uploading the best routes from the bRIB to each speaker (Column 7, lines 8 – 10; Column 6, lines 54 – 56); applying outbound policy to the uploaded best routes (Column 7, lines 8 – 10; Column 9, lines 24 – 29); and advertising resulting best routes to the peers (Column 13, lines 23 – 43).

Regarding claim 29, Norman teaches the apparatus of claim 28, with a plurality of processors capable of running various functions in the router (Col. 5, lines 23 – 27; Col. 11, lines 4 – 33).

Norman does not explicitly indicate a fourth processor to run a global RIB that maintains a routing table for the apparatus.

Crump teaches a global RIB configured to maintain a routing table for the router (Column 9, lines 49 – 60; Column 9, line 64 – Column 10, line 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Crump's teaching of computing the best routes for the routing table in Norman's system in order to improve router performance by quickly reducing the number of routes that need to be considered and re-communicated over the network to just the best and backup routers.

Norman suggests using a plurality of different control processors operating on different control entity operations in the router (Col. 11, lines 4 – 33).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to separate the processing of certain operations, such as Crump's teaching, to separate distinct processors to further separate the tasks the router must perform for improved performance.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Norman in view of Crump, and further in view of Weyman (2005/0041665).

Regarding claim 10, Norman teaches the system of claim 1 and that the invention is equally applicable to other routing protocols (Column 6, lines 55 – 56).

The combined teaching of Norman and Crump does not explicitly indicate wherein the routing protocol is a distance vector routing protocol.

Weyman teaches a system of dealing with RIB protocol messages that includes using the routing protocol of distance vector routing protocol (Paragraph 81 and 150).

It would have been obvious to one of ordinary skill in the art at the time this invention that one could have tried using distance vector routing protocol instead of BGP in Norman's system in order for the benefits of Norman's system to operate in a network operating the distance vector routing protocol.

(10) Response to Argument

Regarding claims 22 and 28, the appellant argues that the Norman does not disclose a first speaker running on a first processor, a second speaker running on a second processor and a third processor running the bRIB. See Appellant's brief pg 15-17.

The examiner respectively disagrees.

Speakers are defined in the claimed invention has operating on a processor to handle connections, receive routes from peer routers, apply inbound policy, and sending the received peer routes to the protocol RIB. *See* Appellant's brief pg 30. Norman discloses a line card (*See* col. 5, lines 11 – 17) which operates to perform operations such as interfacing with network node peers (*See* col. 5, lines 19 – 22), receiving peer routes from those peers (*See* col. 6, lines 64 – 64), and transmitting the peer route information to another processor for processing (*See* col. 7, lines 1 – 4). It is clear in Norman that the described line card contains its own dedicated processor (*See* Fig 1A, element 112; *see also* col. 7, lines 1-4). It is important to note that Norman is not being relied upon to teach the inbound policy applied to the received routes (*See* grounds of rejection listed above). It is clear from the teaching of Norman, that Norman anticipates a first processor which operates as a "speaker" as described in the claimed invention.

The invention of claim 22 goes on to describe a second speaker, operating the same as the first, but on a separate processor. *See* Appellant's brief pg 30. Norman teaches as part of his router, that a plurality of line cards are included (*See* col 5, lines 11 – 22) and additionally that each line card contains its own processor (*See* fig 6). It is clear from the teaching of Norman, that each line card performs the same actions such as receiving and transmitting peer route information (*See* col. 6, line 64 – col. 7, line 4). Since there are more than one line card operating in Norman's router, each with their own processor, Norman teaches a first and second speaker running on a first and second processor.

The invention in claim 22, further requires a protocol RIB which receives the downloaded routes, and computes a set of best routes. *See* Appellant's brief pg 30-31. Norman teaches a controller card (*See* col. 5, lines 23 - 26) which receives the downloaded routes from the line cards (*See* col. 7, line 2 – 4). Norman further teaches that the controller card includes its own processor (See col. 7, lines 19 – 22) and embodiments where there is one controller card operating with two line cards (*See* fig 6). Norman discloses the operation of the controller card include determining the routes that exist in the network and forming a forwarding information table for each of the line cards (*See* col. 9, lines 9 - 29). It is important to note that Norman is not being relied upon to teach calculating the best routes (*See* grounds of rejection listed above). It is clear that Norman teaches a third processor that receives route information from two other processors and performs RIB calculations based on those received routes.

Regarding claims 25 and 29, the appellant argues that the Norman does not describe a fourth processor, different from the first, second and third, which runs a global RIB.

The examiner respectively disagrees.

As previously discussed, Norman teaches a router system with a plurality of line and controller cards combinations which each perform various separate elements processes within the RIB processing of the network (*See* fig 7-8). The examiner has admitted that Norman does not expressly teach a dedicated processor with operates a global RIB as required by the claimed invention (*See* grounds of rejection listed above). Crump teaches a system which is concerned with tracking both the best routes of the system and all (global) routes in the system (*See* col. 7, line 61 – col. 8, line 4; *see also* col. 9, line 10 – 24). Crump teaches the processing both best and optimal routes and maintaining a global copy of every received route in the network, but Crump also does not explicitly indicate that a different processor performs those two separate functions. Norman further discloses as part of his disclose a teaching about the importance of distributing operations among a plurality of processors (*See* abstract, lines 10-19). It would have been obvious to one of ordinary skill to introduce Crump's teaching of having a global route list within the router to allow the router to quickly adjust from the optimal route to another available route if a problem occurs. It would further be obvious to one of ordinary skill at the time the invention was made, based on the suggestion of Norman of parallel processing, to operate some of the controller card processing such as the route selection computations and the maintenance of a global RIB on separate processors, to take advantage of the parallel processing.

Regarding claim 1, the appellant argues that Norman does not teach a plurality of processes operating independently and on different processor, more specifically, that each speaker operate using the same protocol routing information base.

The examiner respectively disagrees.

As discussed previously, Norman teaches an embodiment of his router that operates using two line cards operating as the speakers of the claimed invention and a controller card operating on the route computations as required by the claimed invention.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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